

The economic loss to the United States through disease-carrying insects forms the subject of Bulletin No. 78 of the Entomological Bureau of the U.S. Department of Agriculture. Dealing first with malaria, the author, Dr. L. O. Howard, points out how large is the number of persons incapacitated, for a time at least, from work by this fell disease, and how easily the plague may be stayed by the destruction of mosquitoes. As examples, are cited the work that has been so effectually done at Ismailia and also at Havana. Still more serious are the results of yellow-fever, which, in addition to the huge death-losses during epidemics, is responsible for checking the development of cities such as New Orleans, Memphis, Jacksonville, and Charleston. Their progress has been greatly impeded by this one cause, which has led to a general retardation in the industrial advance of the whole of the southern States. The house-fly, or "typhoid-fly" as Dr. Howard thinks it might well be re-christened, is in some degree an even worse enemy to human progress and development than the yellow-fever mosquito, and the urgent need of a war of extermination against both these pernicious insects is strongly emphasised. Although the influence of these enemies to progress has been ignored by historians, it has, nevertheless, been great in the past, and promises, unless checked, to be still greater in the future. "The world has entered the historical age when national greatness and national decay will be based on physical rather than moral considerations, and it is vitally incumbent upon nations to use every possible effort and every possible means to check physical deterioration."

The second annual report of the committee of the South African Central Locust Bureau, drawn up by Mr. C. Fuller, and recently issued by the Government printers at Cape Town, contains a full account of the means taken by the different local administrations for the destruction of locusts during the summer of 1907-8. It is somewhat unfortunate that the Central Bureau has no control over the action of these local bodies, so that its functions are in great measure limited to receiving and transmitting warnings of the approach of locust-swarms. It is, however, satisfactory to learn that German South-west Africa and Mozambique are cooperating with the British Government in the work of prevention. For years past, it is stated, the hope has been entertained by the farmers that the locusts would disappear for a time, as has been the case on previous occasions. Such a disappearance cannot be accelerated by the work of the Bureau, but when it does come, the information gained by the recent work of that body cannot fail to be of the highest value to the country in the future. The work of extermination in South Africa is rendered the more onerous on account of the presence in some parts of the country of two species of locust, one of which breeds much earlier than the other. Consequently, no sooner is one campaign completed than preparations have to be made for a second.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Prof. M. C. Potter, professor of botany at Durham University, has been approved by the general board of studies for the degree of Doctor in Science.

The chemical laboratory will be open for the use of students during the ensuing vacation from July 5 to August 21. Dr. Fenton will give a course of fifteen lectures on the outlines of general chemistry. Mr. J. E. Purvis will give a course of lectures and practical instruction in pharmaceutical chemistry.

Mr. F. G. Smart has offered to give to the University the sum of 600*l.* in order to found two prizes to be awarded in each year, one for botany and one for zoology. The council of the Senate recommends that Mr. Smart's offer be gratefully accepted.

LORD AND LADY STANLEY OF ALDERLEY have endowed the London School of Tropical Medicine with a capital sum producing a yearly income of 50*l.* in memory of their son, the Hon. E. J. Stanley, who died at Sokoto, in Northern Nigeria, on November 14, 1908.

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PROF. SAMUEL AVERY, who has been head of the department of chemistry in the University of Nebraska since 1905, has been elected president of that institution. He was born in 1865, and was educated at Doane College, the University of Nebraska, and the University of Heidelberg.

The University of Glasgow has conferred the honorary degree of LL.D. upon Mr. W. H. Maw, past-president of the Institution of Mechanical Engineers and of the Royal Astronomical Society, and Prof. C. S. Sherrington, F.R.S.

THE Darien Press, Edinburgh, has published for the International Academic Committee of the Students' Representative Council of Edinburgh University "A Handbook on Foreign Study," which has been compiled and edited by Mr. H. J. Darnton-Fraser, convener of the committee. Copies of the handbook may be obtained, price sixpence net, from the offices of the Students' Representative Council. The object of the handbook is to popularise in British academic circles the idea of studying abroad, and to afford persons who desire to follow this course some general guidance as to the best place to go to with the maximum of pleasure and profit. The volume is provided with a short introduction by Mr. Haldane, in which he refers to the value of foreign study, and seven articles on study abroad in various subjects are included. Prof. A. S. Pringle-Pattison deals with philosophy, Prof. William Osler, F.R.S., with medicine, Dr. J. Howarth-Pringle with surgery, Mr. J. A. S. Watson with agriculture, and Dr. T. C. Thomson with science and engineering. Valuable information of the kind a student must have is given about the various universities of Europe, and useful general information concerning study in the various countries of Europe.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Microscopical Society, May 19.—Mr. F. J. Cheshire, vice-president, in the chair.—The Foraminifera of the shore-sands of Selsey Bill, Sussex, part ii.: E. Heron-Allen and A. Earland.—A new illuminator for the microscope: J. W. Gordon. The apparatus provides a simple and effective means by which the intensity of the light can be regulated without disturbing any focal or aperture adjustment.

Linnean Society, May 24.—Dr. D. H. Scott, F.R.S., president, in the chair.—Presidential address, adaptation in fossil plants: Dr. D. H. Scott.

Geological Society, May 26.—Prof. W. J. Sollas, F.R.S., president, in the chair.—The cauldron subsidence of Glen Coe and the associated igneous phenomena: C. T. Clough, H. B. Muff, and E. B. Bailey. The succession of volcanic rocks in Glen Coe is mainly a series of lavas, of which there are three types, augite-andesite, hornblende-andesite, and rhyolite. Agglomerates, tuffs, and sediments form but a small portion of the sequence. The Lower Old Red Sandstone age of the rocks is proved by the occurrence of plant-remains in shales at the base. The sequence is divisible into groups, which are not, however, persistent over the whole area. Each group may contain different types of lava, which interdigitate one with the other. It is probable that the district was supplied from more than one centre, the foci being independent as regards type of material erupted, although their periods of activity overlapped. The volcanic pile with patches of conglomerate and breccia at the base rests upon an uneven floor, evidently a land-surface, of the Highland Schists, and, further, the eruptions appear to have been subaerial. The cauldron subsidence, which let down the volcanic rocks and the underlying schists some thousands of feet, affected an area roughly oval in shape and measuring eight miles by five.—The pitting of flint-surfaces: C. Carus-Wilson. Regular pittings of uniform size are occasionally seen on flints which have been exposed to the weather. It is believed that the pittings are due to mechanical action. Observations and experiments carried out by the author indicate that such markings cannot have been produced by blows, or by any process of desiccation, and that the freezing of the absorbed

water seems to be the only satisfactory explanation to account for the various details of the phenomenon.

PARIS.

Academy of Sciences, May 24.—M. Bouchard in the chair.—A hypothesis relating to the nature of the internal pressure in fluids: E. H. **Amagat**.—The infinitely small deformation of ruled surfaces: J. **Haag**.—Mixed linear equations: G. **Bratu**.—The sum of the n first coefficients of a Taylor's series: Carl **Hansen**.—General representations of functions: L. **Desaint**.—Certain singularities of differential equations: Richard **Birkeland**.—Differential equations of the second order with fixed critical points: Jean **Chazy**.—The preliminary map of the Chari region (French Congo): G. **Brue**.—A self-recording compass: M. **Heit**. An apparatus is described and illustrated capable of recording automatically the deviations of a marine compass, and hence the course of the ship. The instrument is capable of furnishing valuable evidence as to the responsibility in cases of collisions.—The theory of discontinuous discharges in Geissler tubes: H. A. **Perkins**. Regarding the tube as a condenser in circuit with a high resistance, a theory of the discharge through a Geissler tube is developed which is in accord with some hitherto unexplained experimental results.—Internal pressure in gases: A. **Leduc**. From Amagat's results, the internal pressure for any gas at constant temperature is inversely as the square of the specific volume. From a discussion of experiments made on gases at low pressures, 0.5 to 3 atmospheres, this law is confirmed, and the author regards this as furnishing a proof of the accuracy of his experimental work, especially that dealing with the coefficients of expansion.—The solubility of lead sulphate: J. **Sehnal**. The solubility of lead sulphate appears to be the same at 20° C. and 100° C., 0.0824 gr. per 1000 c.c., and this figure is reduced by the addition of very small amounts of sulphuric acid. The experiments are in accord with the hypothesis that lead sulphate is insoluble as such, its apparent solubility being due to a slow interaction with water, lead hydroxide and sulphuric acid being formed.—Revision of the atomic weight of phosphorus: G. Ter **Gazarian**. The mean of six concordant experiments on the density of carefully purified hydrogen phosphide gave 1.5293 grams as the weight of a litre under normal temperature and pressure. This gives 30.906 as the atomic weight of phosphorus ($O=16$). It is worthy of note that this is exactly the figure calculated by Bernoulli, starting from certain hypotheses on the constitution of the elements.—Syntheses of some derivatives of racemic fenone: L. **Bouveault** and M. **Levallois**.—Ring formation of ketonic acids: E. E. **Blaise** and A. **Kochler**.—The oxidation of the polyhydric alcohols by a peroxydasic system: E. **de Stœcklin** and E. **Vulquin**. The oxidising agent used is a saturated solution of quinhydrone containing a trace of a ferric salt, together with hydrogen peroxide. The application of the reagent to the oxidation of glycerol, glycol, mannitol, sorbitol, and dulcitol is described.—The phenomena of fertilisation in the *Zygnema*: P. A. **Dangeard**.—New observation on the moth of the olive (*Prays oleae*): Th. **Dumont**. This moth, in development, does not always have three complete generations; it may have two or three, according as the eggs are deposited on the leaves or fruit. If for any reason the flowers are lacking, only a single generation can be observed.—The action of the vibrations of the vowel siren on the ear in a pathological state: M. **Ranjard**.—The relation between sleep and the retention of interstitial water: M. **Devaux**.—The metamorphosis of the muscular system in the Muscidae: Charles **Pérez**.—The existence of gemmiform conjugation in *Ephelota gemmipara*: B. **Collin**.—The function of external water in impregnation and first stages of development of *Rana fusca*: E. **Bataillon**.—The formation of the body by the union of two independent halves in *Syllis*: Aug. **Michel**.—Two different modes of regeneration in *Linus ruber*: Mieczyslaw **Oxner**.—The phenomenon of intermittence of the *Gouffre de Poudak*: E. A. **Martel**. This basin is situated at a height of 540 metres, at Poudak (Hautes-Pyrénées), and has a depth varying from 3 to 14.5 metres. The water-level rises 4 metres in fifteen minutes, remains steady for three minutes, and

descends to the original level in forty minutes, each complete pulsation thus taking fifty-eight minutes. A complete explanation is wanting for this curious phenomenon.—The roots of the higher strata of the western Alps: Emile **Haug**.—The extension of the chalk marl in the neighbourhood of Foucarmont (Seine-Inférieure): Paul **Lemoine**.

June 1.—M. Bouchard in the chair.—The relations between the permeability of soils and their aptitude for irrigation: A. **Müntz** and L. **Faure**. Alluvial deposits; contrary to the generally received idea, differ greatly in their permeability to water. Thus one of two supposed identical soils proved to be 600 times more permeable than the other, and the results of cultivation obtained were in close relation to the permeability. A method of measuring the permeability of a soil is described, and also a mode of establishing a scale by means of which different soils can be compared. Details of the results obtained with seventeen soils are given, showing permeabilities ranging from 0 to 141, and these figures are discussed from the point of view of the suitability of these soils for irrigation. The first results obtained by the commission for studying the water-power of the Alps and Pyrenees: Michel **Lévy**. The mean altitude of the greater part of the hydrographic basins of the French Alps has been calculated. The yields are considerably below the figures accepted before the survey.—The granite, gneiss, and porphyry of the island of Elba: Pierre **Termier**.—The perpetual secretary announced the death of T. W. Engelmann, correspondant of the academy for the section of medicine and surgery.—The theory of functions: Paul **Koebe**.—The evolution of heat by radio-active bodies: William **Duane**. Two evacuated glass bulbs containing ether, and connected by a capillary, form a differential calorimeter of great sensitiveness, the whole being enclosed in a massive block of lead. Any heat evolved in one bulb results in an increase in the vapour pressure of the ether and the motion of an air bubble in the connecting capillary. This bubble is brought back to the original position by utilising the Peltier effect in an iron-nickel couple. The instrument has been applied to the measurement of the heat evolved from radio-thorium, 0.025 calories per hour, a quantity of the same order as that disengaged by radium.—The radium and uranium contained in radio-active minerals: Mlle. Ellen **Gleditsch**. A new method for determining the radium in radio-active minerals is described. The minerals examined were a French autunite, a Joachimsthal pitchblende, and a Ceylon thorianite; the ratio of radium to uranium was not found to be constant in these minerals.—The composition of atmospheric air: Georges **Claude**. A description of further results obtained by the fractional distillation of liquid air by the apparatus described in an earlier paper. The conclusion is drawn that 1,000,000 volumes of air contain 15 of neon, 5 of helium, and 1 of hydrogen.—The conditions of electric charge of particles in suspension in a gas: the charges of chemical fumes: MM. **de Broglie** and **Brizard**. The fumes were examined by the ultramicroscope in an electric field. Any fumes produced by chemical action without rise of temperature are not charged electrically, and this also holds for sulphur distilled in a current of nitrogen. Fumes produced in vigorous chemical reactions, with marked rise of temperature, are charged.—The physico-chemical study of some pharmaceutical incompatibles: E. **Caille**. Certain mixtures, such as salol and camphor, form eutectics fusible at ordinary temperatures. Curves are given for salol-camphor and resorcinol-camphor mixtures.—Observations on the oxides of uranium: Oechsner **de Coninck**.—A chromyl subchloride: P. **Pascal**. Chromyl chloride, CrO_2Cl_2 , is reduced by nitric oxide, a chloride, $(CrO_2)_2Cl_2$, being formed. Details of the chemical properties of this substance are given.—A new medicinal bark from the Ivory Coast and its alkaloid: Em. **Perrot**.—The catalase of the blood: C. **Gessard**. Hæmoglobin and fibrin, carefully freed from catalase, are without action on hydrogen peroxide solutions.—The determination of the temperature of Pasteurisation of milk with respect to its industrial applications. The influence of the heating on the conservation of the physiological properties of milk: P. **Maxé**, P. **Guérault**, and

M. Dinescu.—The hypotensive and myotic action of normal human urine: J. E. Abelous and E. Bardier.—The metamorphosis of the muscular system in flies: Charles Perez.—*Lathraea clandestina*, a parasite of the vine in Loire-Inférieure: M. Col.—The strata of the eastern Alps and their roots: Emile Haug.—The existence of a conglomerate and an Eocene discordance in Greece: Ph. Négri.—New observations on the strata of eastern Corsica: E. Maury.

DIARY OF SOCIETIES.

THURSDAY, JUNE 10.

ROYAL SOCIETY, at 4.30.—Croonian Lecture: The Functions of the Pituitary Body: Prof. E. A. Schäfer, F.R.S.—(1) A Wave-length Comparator for Standards of Length; (2) The Use of Wave-length Rulings as defining Lines on Standards of Length: Dr. A. E. H. Tutton, F.R.S.

ROYAL INSTITUTION, at 3.—A Modern Railway Problem—Steam vs. Electricity: Prof. W. E. Dalby.

MATHEMATICAL SOCIETY, at 5.30.—On the Behaviour at the Poles of a Series of Legendre's Functions representing a Function with Infinite Discontinuities: F. J. W. Whipple.—An Analogue of Pascal's Theorem in Three Dimensions: W. H. Salmon.—Some Symbolical Expressions for the Eliminant of Two Binary Quantics: A. L. Dixon.

FRIDAY, JUNE 11.

ROYAL INSTITUTION, at 9.—Problems of Helium and Radium: Sir James Dewar, F.R.S.

PHYSICAL SOCIETY, at 8.—The Arthur Wright Electrical Device for evaluating Formulæ and solving Equations: Dr. A. Russell and Arthur Wright.—The Echelon Spectroscope, its Secondary Action and the Structure of the Green Hg line: H. Stansfield.—The Proposed International Unit of Candle Power: C. C. Paterson.—Inductance and Resistance in Telephone and other Circuits: Dr. J. W. Nicholson.—Note on Terrestrial Magnetism: G. W. Walker.—On the Form of the Pulses constituting White Light: A. Eagle.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Observations of Helium D₃ Absorption in the Neighbourhood of Sun-spots in 1908: Capt. R. A. C. Daunt.—The Constants of the Moon's Physical Libration: F. J. M. Stratton.—On certain Coefficients in the Algebraical Development of the Perturbative Function: R. T. A. Innes.—Magnitude of η Argus, 1909: R. T. A. Innes.—Recent Observations of the Rings of Saturn, and their Bearing on some of the Phenomena of the Disappearance of the Rings in 1907: E. E. Barnard.—Ephemeris of Flora near the Time of Opposition in 1909: A. M. W. Downing.—Report on the Measurement of an Arc of Meridian in Uganda: Col. C. F. Close.—On the Erroneous Results of Stereoscopic Observations of a Comet: E. E. Barnard.—A Method of Double Star Measurement: J. B. Dale.—Note on an Electric Heater for use in a Plate Holder on Damp Nights: Astronomer Royal.—*Probable Paper*: Numerical Example of Mr. Innes's Method for the Development of the Perturbative Function: F. Robbins.

MALACOLOGICAL SOCIETY, at 8.—Diagnoses of new Trochoid Shells from North Queensland: H. B. Preston.—Notes on some of the Ampullariidæ in the Paris and Geneva Museums: G. B. Sowerby.—On the Radulæ of British Helicidæ: Rev. E. W. W. Bowell.

SATURDAY, JUNE 12.

ROYAL INSTITUTION, at 3.—The Vitality of Seeds and Plants: (2) The Life and Death of Seeds: Dr. F. F. Blackman, F.R.S.

MONDAY, JUNE 14.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Survey and Exploration in the Ruwenzori and Lake Region, Central Africa: Major R. G. T. Bright, C.M.G.

TUESDAY, JUNE 15.

ZOOLOGICAL SOCIETY, at 8.30.—On some Points in the Structure of the Lesser Anteater (*Tamandua tetradactyla*), with a Note on the Cerebral Arteries of Myrmecophaga: F. E. Beddard, F.R.S.—On Decapod Crustacea from Christmas Island, collected by Dr. C. W. Andrews, F.R.S.: Dr. W. T. Calman.—Notes on a Young Specimen of the Walrus lately living in the Society's Gardens: Dr. P. Chalmers Mitchell, F.R.S.—Notes on the Viscera of a Walrus (*Trichechus rosmarus*): R. H. Burne.

ROYAL STATISTICAL SOCIETY, at 5.—Annual General Meeting.

FARADAY SOCIETY, at 8.—The National and International Conservation of Water for Power: E. R. Taylor.—The Formation of Silicon Sulphide in the Desulphurisation of Iron: W. Fielding.—A Contribution to the Study of Electric Furnaces as applied to the Manufacture of Iron and Steel: C. A. Keller.—Automatically Circulating Furnaces of the Gin Type for the Electrical Production of Steel: G. Gin.

MINERALOGICAL SOCIETY, at 8.—On Carnotite and an Associated Mineral Complex from South Australia: T. Crook and G. S. Blake.—On the Species Pilolite, and the Analysis of a Specimen from China: G. S. Whitby.—On Phenacite from Brazil: Dr. G. F. Herbert Smith.—The Composition and Structure of a Meteoric Stone from the Dokáchi Shower (1903): H. E. Clarke and Prof. H. L. Bowman.

WEDNESDAY, JUNE 16.

GEOLOGICAL SOCIETY, at 8.—The Carboniferous Limestone of County Clare: J. A. Douglas.—The Howgill Fells and their Topography: Dr. J. E. Marr, F.R.S., and G. W. Fearnside.—The Mandible of *Sthenurus occidentalis*, sp.n.: L. Glauret.—(1) On some Reptilian Remains from the Trias of Lissiemouth; (2) On some Reptilian Tracks from the Trias of Runcorn; (3) The Anatomy of *Lepidophlois laricinus*, Sternb.: D. M. S. Watson.

ROYAL METEOROLOGICAL SOCIETY, at 4.30.—The Interdiurnal Variability of Temperature in Antarctic and Sub-Antarctic Regions: R. C. Mossman.—Testing of Registering Balloon Apparatus at Low Tempera-

tures: Dr. W. Schmidt and E. Gold.—A Plea for the Use of Freely-exposed Thermometers in Addition to Sheltered Ones: L. C. W. Bonacina.

ROYAL MICROSCOPICAL SOCIETY, at 8.

THURSDAY, JUNE 17.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: On the Origin of Certain Lines in the Spectrum of ϵ Orionis (Alnitam): Sir Norman Lockyer, K.C.B., F.R.S., F. E. Baxandall, and C. P. Butler.—On Electrostatic Induction through Solid Insulators: Prof. H. A. Wilson, F.R.S.—The Effect of Pressure on the Band Spectra of the Fluorides of the Metals of the Alkaline Earths: R. Rossi.—The Ionisation produced by an α Particle. Part I.: Dr. H. Geiger.—On the Diffuse Reflection of the α Particle: Dr. H. Geiger and E. Marsden.—The Decay of Surface Waves produced by a Superposed Layer of Viscous Fluid: W. J. Harrison.—The Passage of Electricity through Gaseous Mixtures: E. M. Wellisch.—A Study of the Use of Photographic Plates for the Recording of Position: C. E. K. Mees.—The Coefficients of Capacity and the Mutual Attractions or Repulsions of Two Electrified Spherical Conductors when close together: Dr. Alexander Russell.

LINEAN SOCIETY, at 8.—On the Growth of a Species of Battarea: J. G. A. Tepper.—The Deposits in the Indian Ocean: Sir John Murray, K.C.B., F.R.S.—The *Sealark* Persidae, Stenopidea, and Reptantia: L. A. Borradaile.—The *Sealark* Polychæta. Part II.: F. A. Potts.—The *Sealark* Lepidoptera: T. Bainbridge Fletcher.—New Species of Malesian and Philippine Ferns: Dr. H. Christ.—The African Species of *Triumfetta*, Linn.: T. A. Sprague and J. Hutchinson.—The Acaulescent Species of *Malvastrum*: A. Gray and A. W. Hill.

FRIDAY, JUNE 18.

ROYAL INSTITUTION, at 9.—A Recent Visit to the Panama Canal: A. H. Savage Landor.

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